Arrowhead

COMBAT DEVELOPMENTS COMMAND

february 1973

Commander's Call

Army Reorganization and Maintaining the Momentum of Combat Developments

I do not know anything in my thirty-six years of service that has impressed me more than the very important mission vested in this Command. It is the mission of planning the future of our Army, and that mission *must* and *will* go on through the course of the planned reorganization.

As our Army, as part of the defense team, moves deliberately to adjust to the future, it must make changes that will affect not only Combat Developments Command but also the Army Materiel Command and the Continental Army Command.

Naturally, no reorganization of this magnitude can be done without considerable difficulty. For our part, we have been asked to do the most difficult task of all. First, our very best efforts are needed to help the Army staff see how to make the transition without giving up any on-going CDC work of critical Army importance. Secondly, we must keep marching as a team while, as individuals, some members of the Command have serious doubts about what is going to happen to them personally. Everyone can be very proud that we have not hesitated. We have continued to work on combat developments actions while, at the same time, striving to make the reorganization a success. It has to be done this way.

Our instructions are very clear. Maintain the momentum of the most important things we are doing. Pass each project on to its new home: either the HQ, Training and Doctrine Command; the Centers at Fort Leavenworth, Fort Lee, and Fort Benjamin Harrison; or the two new Department of the Army agencies. Pass each task to them as carefully as we can. This will require the highest degree of motivation from each of us. I ask you to join me in this great challenge—one that deserves our very best efforts—our final mission as members of the United States Army Combat Developments Command.

John Norton

JOHN NORTON
Lieutenant General, US Army
Commanding

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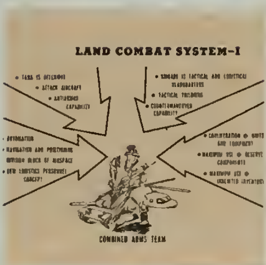

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ARROWHEAD

COMBAT DEVELOPMENTS COMMAND

February 1973 No. 48

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PICTURE CREDITS: All photos, US Army photos.

The ARROWHEAD is an authorized publication of the US Army Combat Developments Command, Ft. Belvoir, Virginia 22060, under the provisions of AR 360-81. Published monthly by means of photo offset reproduction, circulation is 3600 copies. The views expressed herein are not necessarily those of the Department of the Army. Material can be submitted to the Information Officer. Phone: Autovan 354-3982 or commercial area code 703-664-1455. Drafts are accepted with pictures or sketches whenever available.

NIGHTLY THEY FLY:

The CDEC OWL Team

By Captain John J. Hollingsworth

"The terrain rises sharply to the right—there's a gradual rise to the left. If anything goes wrong you can set down on the left."

"Check."

"Scattered trees up ahead, then heavy. Terrain rising gradually to the front through a pass. Road should still be visible."

"I see it."

Probably you will never hear a conversation like this between a pilot and copilot unless you are sitting in an OH–58 LOH or an AH–1G Cobra flying at 200 feet, cruising at 30 knots, under night blackout conditions.

An experimental group of 12 officers from the 155th Aviation Company, attached to the Combat Developments Experimentation Command (CDEC) at Fort Ord, are participating in an unusual night flying training program at CDEC's field laboratory, Hunter Liggett Military Reservation.

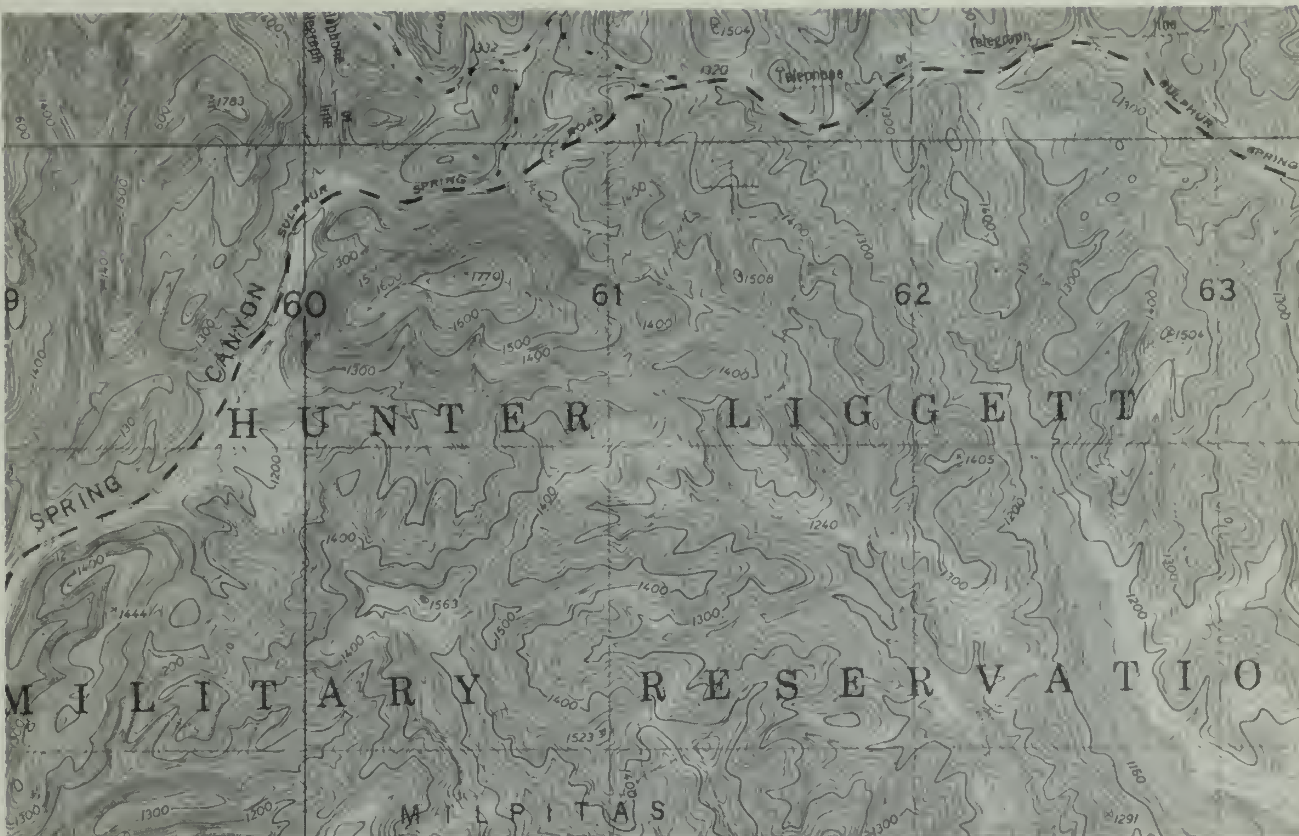
The program is unique because the pilots, all volunteers, operate under conditions where few, if any, aviators have ventured before. Nightly they fly low-level over areas varying from gently rolling valleys to rugged, mountainous terrain under the whole gamut of weather and lighting conditions.

Project Team IV, the CDEC team conducting the training program since July, is determining the skill level a pilot in a standard aircraft can attain through training and experience without sophisticated gadgets. This will develop a baseline from which to develop the minimum essential pilot aids thereby avoiding costly programs to develop sophisticated systems which really are not needed. When training ends, these pilots will develop a program for pilots participating in Experiment 43.7, Attack Helicopter—Clear Night Defense. The experiment pits helicopters, in a night defensive role, against armor.

Because of their night work, the aviators acquired the nickname "Owl Team." All team members had "the standard amount of night flying everyone gets in Vietnam," but they determined 30 hours of ground classwork were necessary before cranking the engine in actual training.

After completing the ground work, the Owl Team began flying at a relatively safe 1500 feet to insure everyone was proficient in standard, cross-country night flying.

Captain Hollingsworth is assigned to the Combat Developments Experimentation Command, Ft. Ord, Calif.



Map of OWL Team Country—The area surrounding Sulphur Spring Road represents typical terrain for OWL Team flights.

After concluding the basic night navigation refresher training, they flew at a lower altitude until everyone felt that they were confident at the new altitude. Then they took a check ride monitored by the "tattletale." The "tattletale," in actuality a radar set, accurately plotted the aircraft's flight path around the check course. The radar produced a print-out which was placed over the check route map to determine how accurately the pilot traversed the course. If Major Richard L. Cox, Team IV's aviation training officer, felt assured the pilots were proficient at that particular altitude, the aviators dropped to the next lower altitude and repeated the training cycle.

From the initial 1500-foot height flying single ships, the Owls now fly three-ship formations at altitudes from a hover to 250 feet. Speeds range from 30 to 120 knots, depending on the terrain and illumination. The pilots acknowledge the "250 feet" figure is misleading to visitors. Everyone thinks it is 250 feet above the highest object in their path, but it is 250 feet above ground level, regardless of tree height. At Hunter Liggett trees reach out and grab anything flying 150 to 200 feet off the deck! This often leaves an actual clearance of only 50 feet between the vegetation and the helicopter; sometimes a little less. As one pilot says, "Everyone has had at least one exciting evening."

The team proudly points out they fly over rugged terrain, not desert where 150-foot trees are absent and radical changes in terrain height fail to exist.

Besides ridges, fingers and trees appearing in front of the aircraft at inopportune times, the pilots face another danger: they fly in an area known as the "dead man zone of the height-velocity curve." Translating into other than aviation terms, this means, if an engine failure occurs, the changes of landing the aircraft undamaged are almost nil. Needless to say, safety and maintenance become the bywords because none of the pilots wants to provide practice for the special crash-rescue teams.

The pilots conduct what they call a "super meticulous" pre-flight check and a thorough post-flight check. They are maintenance sticklers; an engine failure for them can be fatal. So far, 1000 accident-free, low-level, night flying hours are logged on the Owl's books.

If any problems develop during a flight, they make a precautionary landing. The group main-

A WISE CHECK—Pre-flight checks are extremely important. CW2 Stiff, an OWL Team pilot, makes sure his aircraft is ready for low-level night flying.

tains the philosophy that the pilot who thinks he can make it back to the airfield, with an "undiagnosed problem," is making the wrong decision. The navigator constantly advises the pilot of locations for emergency landings if trouble develops.

Because of the Owl Team's unique work, many visitors made special trips to Hunter Liggett to watch the team in action. At a recent night symposium, 80 visitors saw the Owl Team fly a LOH and two Cobras in formation, 10 seconds apart, through rugged terrain and then land in formation without the aid of landing lights. A few doubters disbelieved what they witnessed. They approached Colonel Billy L. Odneal, Team IV's chief, and asked him, "'What's the trick?" "What's the gimmick?" "How are they doing it?" They could not believe the pilots flew the route using nothing but their naked eyes and teamwork.

Members of the R&D community always ask what tools would help the Owl Team fly better. Team members always voice a standard reply—just familiarity with the area. This philosophy is not inflexible though. One device the team experiments with is the PVS–5 night vision bi-

OWL Pilots—OWL Team members are (l to r front row): CW2 Randy Dyer, Cpt. Robert Barthelmess, CW2 Ralph Park, CW2 Russell Carmody; (l to r back row): CW2 John Cole, CW2 Joel Jackson, CW2 Douglas Workings, Cpt. Edward Foster, Jr., CW2 Craig Stiff, Cpt. Alfred Lopez, CW2 Donald Choura, and CW2 Robert Wolff.

noculars. Selected pilots using the binoculars generally show improved performance when traversing check routes. But some pilots normally use an internal and an external reference to maintain proper altitude and speed. The binoculars elimiate this ability to see the internal reference. Consequently, some pilots lose their "seat-of-the-pants" ability to fly the craft, and their performance falls off. The only aid the pilots consistently use is a radar altimeter for accurate altitude readings.

From all their flying, the Owl Team discovers teamwork to be the most important aspect of low-level, night flying. To accurately fly at low-levels, the team divides flying into two distinct tasks: the pilot flys the aircraft, and the copilot navigates for him. The navigator constantly paints a verbal picture about the terrain ahead and to the sides. The pilot, already straining to see that extra foot, needs to know what the terrain looks like ahead. He cannot afford surprises. If the pilot observes the radar altimeter drop from 200 to 100 feet, he has to know that is as far as the altimeter is going to drop, so he avoids damaging the aircraft with a panic climb. In return, the pilot feeds the navigator information he needs to accurately map spot the aircraft's location; the team defines "accurate" as ± 10 meters—at night!

Accuracy is the keystone in the Owl Team's training program. Their training routes simulate moving from a night laager position to the forward edge of a battle area; engaging an enemy armor force; returning to an ammunition supply point and rearming; then re-engaging the enemy force or returning to the laager position. In a night combat environment a pilot has no margin for error in plotting his position. The team feels their training adequately prepares them to accurately night-navigate, but they need a night acquisition device to complete their training.

When first starting training, the Owls never dreamed they would progress to the skill level they now have—flying a three-ship formation capable of taking off and landing under blackout conditions. Pilots claimed success was assured because Colonel Odneal and Major Cox allowed the pilots to proceed at their own pace. No pilot was required to fly at a lower altitude until he became comfortable at the height he was flying.

While it was never envisioned that the pilots of the future would be required to duplicate the Owl Team's experiences of flying without any additional pilot aids, the team's success conclusively proves that accurate low-level flying can be accomplished without costly, highly sophisticated systems.

CDEC Owl Team members are well-trained, and confident—they have the right to be. They are pioneering another phase of Army aviation. The skills and tactics they develop at Hunter Liggett may be used by rotary wing aviators to attack enemy forces on a battlefield of the future.

The Commander's View

By BG Fremont B. Hodson, Jr.

Forward

There has long been a need in the US Army for an integrated systems approach to combat developments in the areas of command, control and intelligence. Senior planners have done something about it.

The Evolution of INCS Group

For the first time in our Army's history, a single organization was developed to give visibility, coordination and cohesive emphasis to command, control, and intelligence to insure that commanders in the near-, mid-, and long-range time frames would have what is needed to command and control forces. The Intelligence and Control Systems Group (INCS Group) with its two subordinate agencies, Communications-Electronics Agency (CEA) and Intelligence Agency (INTA), evolved in the response to CDC functional requirements to coordinate all combat developments activities in the areas of command, control, and intelligence. As a point of departure, this total coordination effort was geared to the needs of the Integrated Battlefield Control System (IBCS)—a system conceptually designed to pull together all aspects of all developmental tactical command and control in support of the Army in the Field.

BG Fremont B. Hodson

Through DA ACSFOR initiative, an Army management committee with USAF and USMC observers was organized to oversee the master plan using IBCS as a planning umbrella. INCS Group was charged with responsibility for analytical studies and requirements, the Army Materiel Command (AMC) for materiel development and procurement, and Modern Army Selected Systems Test, Evaluation and Review (MASSTER) for testing the concepts.

BG Hodson is the Commanding General of INCS GP, Ft. Belvoir, Va.

Where We Were

Several different Army agencies were going their own way in their functional areas and a need for a systems approach to these divergent paths was apparent. The lack of a centralized focal point to coordinate and integrate all related efforts had resulted in fragmented effort and duplication with attendant waste of valuable resources and a substandard end product. Prior to USACDC reorganization in 1971, there was no single organization to guide and synthesize combat development efforts in the area of command, control, and intelligence. If the DA staff required information on command, control, or intelligence, queries would have to be made to the respective branch agency or agencies. Each agency was going its own way developing the best possible system for its own particular needs with little or no Army-wide integration. As a result, advances in firepower, maneuver, and combat service support were not matched by advances in command, control, intelligence, and communications. The ability to integrate and control the functions of land combat had not kept pace. Therefore, the commander in the field had well-trained forces with the means to deploy them rapidly but did not have the best information available upon which to base his tactical deployment decision.

What Problems Must Be Addressed

Future commanders will be confronted by threats consisting of a large number of highly mobile maneuver units having a sophisticated array of weapons systems on which current data are required. Large amounts of data will be required on enemy threat forces consisting of armored and mechanized units, artillery and missile systems with nuclear capabilities, air defense elements, airmobile units, intelligence, electronic warfare, and other combat and combat support elements. Also required will be extensive data on the current status and deployment of their highly mobile forces. Armed with current, accurate information, commanders will have a decided advantage in exploiting the combat situation and influencing the battle on a scale not previously possible. If staff and command systems are also improved, commanders can further capitalize on current, accurate, and complete tactical information and ascertain changes in deployment of opposing forces, discover strengths and weaknesses of enemy and friendly forces, and determine courses of action which will permit the most effective employment of friendly forces and resources to achieve control of the battlefield.

Things Only Change in Magnitude

Warfare in its most basic sense has not changed much with the passage of time. The concept of an integrated battlefield control system has changed only in scope. For instance, commanders hundreds of years ago could control only what they could see; communicate only as fast as a horse could carry a message; volume was constrained by the weight the horse could carry. Today the commander's range is intercontinental; communication is constrained only by the speed of light. Massive transportation carriers all but eliminate volume constraints. Technology has provided new command and control procedures which we really have not learned to use. We must insure that the commander has the necessary tools and organization to include a trained staff to operate and make accurate and timely decisions which will influence his battlefield formations.

What We Are Doing

The job of INCS Group is to put "it" all together so that all the command, control, and intelligence needs of combat commanders have been satisfied. It is not necessary, or always advisable, that all command functions be accomplished in the same geographic location in today's or the future's combat environment. However, it is necessary that each staff element use the same data base for analysis so that the commander has complete accurate and timely information. Command and control must also take care of routine matters and at the same time insulate commanders from the mundane. The commander cannot be concerned with each minute detail and still have to make critical decisions.

INCS Group, using the Integrated Battlefield Control System (IBCS) proposition as a baseline, is looking at staff organization and proce-

INCS GP HEADQUARTERS

dures in every detail. In order to use the available tools, the commander must know exactly what is happening on the battlefield on a real time basis. A major part of the IBCS study concerns what we do now. Outputs of the study will be an examination of how information is exchanged between all elements of the Command; what is contained in reports if it is needed, where it is used, and when it is used. End results will eliminate duplication and make organizational procedures more responsive to the commander's needs.

In an integrated battlefield control system, all staff and subordinate elements must be mutually supporting and compatible. Prior to INCS Group and the IBCS concept, this did not always occur. For example, tactical data systems were under development by many different agencies. If the computers in each system were not compatible in language and word size, a third computer was required for translation, resulting in a tremendous waste of resources. Now with a master plan to guide developmental efforts, we can have compatibility. For example, TACFIRE uses a set of equipment. The Tactical Operations Systems (TOS) will use many on the same components because developmental efforts have constrained TOS to follow TACFIRE. Air Traffic Control and Coordination System (TSO/73) and Air Traffic Managment Automated Center (ATMAC) may also be able to use the same or slightly modified components. As a result, many advantages may occur: major developmental costs occur only once; you only have to train one man to operate and maintain the computer for three systems; the overall systems cost decreases as the logistical pipeline requires parts for only one system. By organizing responsibilities in a master plan and constraining them at a focal point, the job is done properly with least cost and the end result is a workable system.

It is fairly easy to get experienced commanders to agree on materiel needs. For instance, most desire a smaller, quieter generator. However, it is not such an easy task to obtain agreement on the direction in which research should proceed in doctrinal areas. INCS Group is presently conducting a command post program which is a structural survey of experienced commanders to identify critical areas where research must be directed in the command and control areas. Through this survey, research guidelines will be further refined for future study programs.

Another major area which has caused commanders problems is that of communications. We have had rapidly expanding innovations in

the areas of firepower and maneuverability. Matching developments are expanding command and control concepts. Previously, no focal point existed to insure that organizational concepts insured adequate communication capabilities. With INCS Group now as a focal point, we can influence and guide communications capabilities from the communications zone down to squad level. Tradeoffs can be analyzed to insure that communications requirements meet the minimum essential for the commander's needs. In the future, this will assume critical proportions when sophisticated command and control systems such as TACFIRE and TOS are fielded. We must have sophisticated communication capabilities in real time or near real time to support these systems.

Another major benefit that has occurred in the communications area is that we can now truly adapt a systems viewpoint. Communications planners examine every device that emits a signal. We will know how one device impacts on another. This again is a case in point of mutually supporting devices forming a total integrated battlefield control system under the guidance of one organization.

INCS GROUP PROGRAMS

PRODUCTS

PROGRAMS	STUDIES	DOCT	ORG	ROC	TEST
IBCS	SECOND REFINEMENT	-	-	-	113
ARTAOS	INTEROPS	-	BOI TOS	TOS	119 & 120
COMM	INTACS	FM 11-125	TOE 11-85	AUTO-SWITCH	TASS
INTEL	INTEL CONCEPTS	FM 30-5	TOE 30-215T	REMBASS	MASSTER V
EW	MIP	EW CONCEPTS	TOE 32-83H	BARCS	POE

SYSTEMS

COMBAT DEVELOPMENT PRODUCTS

How We Do What We Do

INCS Group accomplishes its mission by intensive management of five major programs: Integrated Battlefield Control System (IBCS), Army Tactical Data Systems (ARTADS), Communications-Electronics (COMM), Intelligence (INTEL) and Electronic Warfare (EW). A Command Group, five directorates, and two agencies accomplish the assigned mission. Four of the directorates—Concepts and Command Systems Directorate (CACS), Control Systems Directorate (CSD), Intelligence Systems Directorate (ISD), and Test and Evaluation Directorate (TED)—are the operational elements of the Group Headquarters. These elements plus the two subordinate agencies have the responsibility of accomplishing the actions assigned to the five programs.

The Communications-Electronics Agency (CEA) and the Intelligence Agency (INTA) are under the command of Group Headquarters. Staff supervision for the CEA is assigned to the Director, CSD and staff supervision for INTA is assigned to the Director, ISD. These directorates closely monitor the tasking and resource requirements of the subordinate agencies.

Group Headquarters is responsible for all key decisions pertaining to the actions on the CDC Significant Action List and all principal actions. It provides guidance, establishes the priorities, selects the principal actions for intensive management, and directs the INCS Group operations. Through personal conferences with CG, USACDC, personal visits to the agencies, staff meetings, briefings, individual conferences with directors and a monthly Program Review, programs are managed to insure the successful accomplishment of the mission. It is through the medium of the Program Review, an executive review, that program integration is assured, priorities and resources confirmed or modified, and program direction maintained.

The major portion of the work done by the Group is expended on the USACDC Significant Actions and INCS Group Principal Actions which support the Command Priority Objectives Program. Work schedules, milestones and allocation of resources are accurately determined for each Principal and Significant Action. These actions are intensively managed by Group Headquarters, Agency Commanders and the Directors.

Figure 1 shows how INCS Group programs are merged into integrated systems and how combat development products of studies, doctrine, organization, required operational capabilities and test flow out in a logical manner.

Where We Are Going

INCS Group has provided the link that produces visibility to command, control, and intelligence needs for the present and the future. We have now integrated coherent studies that furnish Department of the Army the necessary data for enlightened decisions in the present, mid, and long-range time frames. INCS Group has addressed command and control in all of its manifestations and has insured that dynamic events have evolved in a logical flow. Evolutionary changes have resulted for the customer. At the same time, revolutionary requirements have been given to the military and civilian materiel developers. Using the IBCS proposition as a master plan, INCS Group has started the process of putting together every element which will insure that commanders in the field have the world's best command, control, and intelligence systems upon which to base their decisions.

At this time, it is impossible to determine how much automation or intelligence is necessary for commanders in the present or the future. The benefits and the burdens are continuously being reviewed by scientific researchers in an attempt to come up with the answers.

INCS Group has applied creativity to its study processes by looking into the future in an imaginative manner. In doing so, the constraints have been removed from our thought processes and the strange is no longer quite so strange. As a result we develop doctrine and organizations which produce materiel requirements that integrate into complete systems and insure that all the functions of combat are properly addressed.

We do not have all the answers. However, in the past year tremendous progress has been made. In many areas, significant combat developments breakthroughs are at hand. Results in the near time frame will soon show the wisdom of previous work. Reorganization will change our make-up, but the functions will continue.

ADVANCED CONCEPTS ORGANIZATIONS

By Dr. William L. Archer

In 1967, the Army Chief of Staff, General Harold K. Johnson, established a unique new study group known as the Advanced Concepts Organizations to develop a conceptual design for the Army in the Field in the 1990 decade. One result of their efforts, the Land Combat System–I (LCS–I) study, has recently been completed and if initial reactions are any indication, it is likely to have a substantial influence on both the R&D and doctrinal study programs for some years to come.

The Advanced Concepts Organizations, or ACO as it is known, originated with a suggestion by the Assistant Secretary of the Army (R&D), Mr. Willis M. Hawkins, that "the Army needs to find a way to use its technical capability in a more creative way in the new concept and system optimization role." Put more simply, there must be a better way to define future goals for the Army than the fragmented, case-by-case approach used in the past.

A Committee of Four was organized to study this question and comprised Dr. Wilbur B. Payne, Mr. David C. Hardison, Colonel K. C. Emerson, and Dr. Ralph G. H. Siu. In a briefing to General Johnson in late 1966, this Committee recommended several "improvement opportunities," one of which specifically discussed the Army's concept study program. They stated that "these concept studies must produce the unifying framework, together with policies, goals, and priorities to guide and control subsequent development actions." There was seen a need to determine the best balance of resource emphasis among the combat functions based on a first rate projection of future Army problems and an appreciation of the full range of solution choices made possible by technology. Most importantly, there should be a fully supported effort to develop and evaluate alternative conceptual designs for a unified land combat system.

Among the Committee of Four recommendations was the establishment of a joint effort by three organizations which became the ACO, to accomplish a new conceptual study. The development of conceptual designs and their evaluation would be the task of the Institute of Land Combat (ILC) an element of the United States Army Combat Developments Command. ILC would also be responsible for the overall production of the Land Combat System study. Technological projections appropriate for the 1990 timeframe would be produced by the Advanced Materiel Concepts Agency (AMCA) of the United States Army Materiel Command. The efforts of these two elements of the ACO would be supported by the Intelligence Threat Analysis Detachment (ITAD) of the ACSI.

The concept of associating these three organizations in an Advanced Concepts Organizations was an innovation in the conduct of an Army

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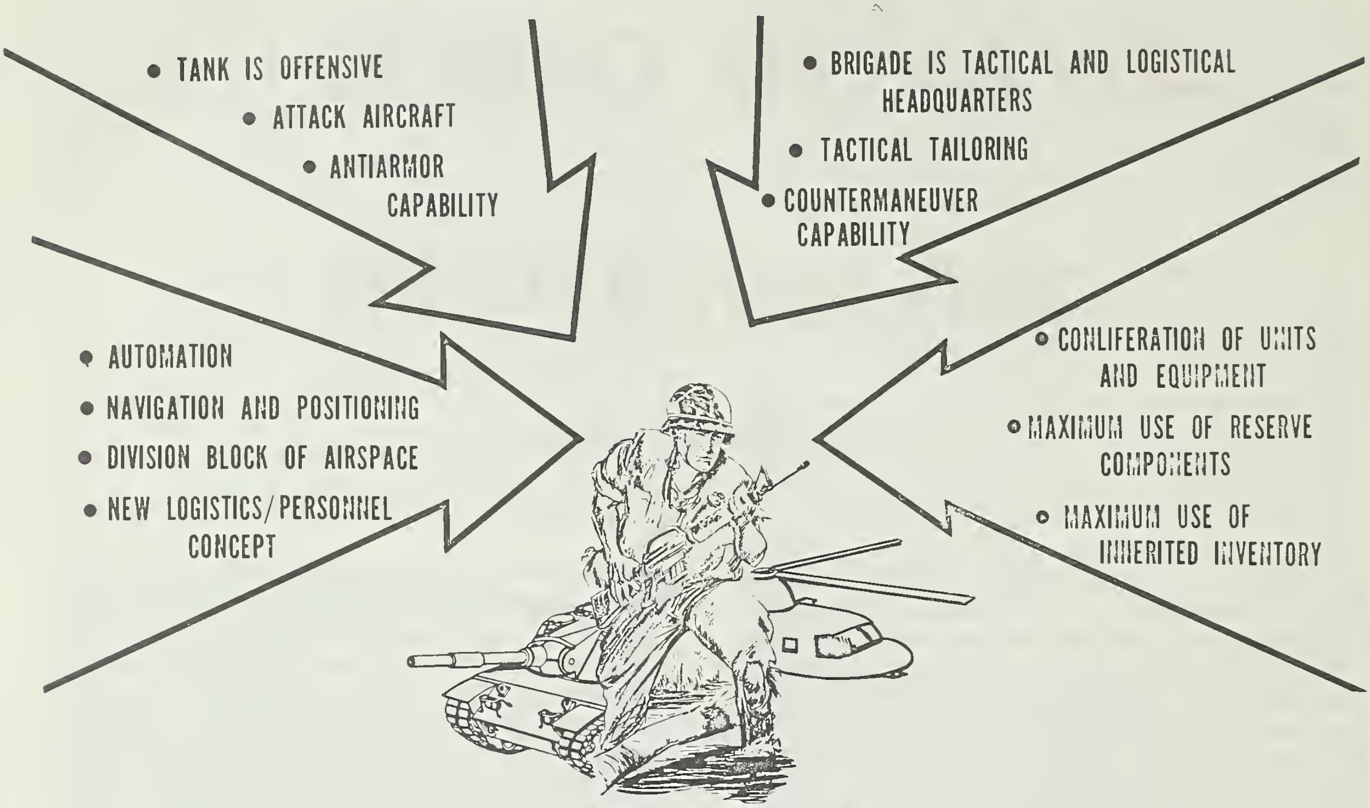
LAND COMBAT SYSTEM–I



COMBINED ARMS TEAM

study in that they were given a joint responsibility for LSC–I while remaining within different Army commands. The intent was that the members of the ACO would be collocated so as to permit daily contact and interaction during the study. In 1969, AMCA and ILC were both located in the Hoffman Building in Alexandria, but ITAD remained at Arlington Hall.

Getting an organization such as the ACO up to speed in a study effort as complex as LSC–I presented new problems and required a certain amount of build-up time. A plan of study was produced early in 1968 and a modus operandi developed through discussions and memoranda of understanding within the ACO. Although there was no one authority immediately supervising the study, monitorship and guidance was provided by periodic meeting of the Commanders of AMC and USACDC, and the ACSI, known collectively as the TRIO.

The basic LCS–I plan was fairly simple and straightforward. Possible future conflicts were analyzed to determine major threats and to provide the Army tasks against which the new operational concepts were developed. Statements of functional objectives in carrying out Army tasks provided the initial basis for new material derived from advanced technological projections. Together, the threat and new materiel concepts were woven into alternative new designs for a land combat system. In all of this, there was, of course, a feed back action between the conceptual designer and the materiel developer as new operational needs were identified. Finally, the concepts were evaluated for strengths and weaknesses and a single design recommended as the final product of the study.

An early output of LCS–I was the publication of Conflict Situations and Army Tasks 1985–90 (CSAT 90) in 1970. Current and historical con-

ditions in worldwide geographical areas were analyzed to identify trends in political, economic, social, and military situations for projecting future environments and possible conflicts. A large number of conflict situations were analyzed in various ways to provide insights into potential future threats. A smaller number of representative situations were then selected for deriving the projected Army tasks in the 1990s. This extensive and systematic study of future world conditions kicked off the ACO collaboration between ILC, which carried it out, and ITAD which was a major contributor.

A second major product of the overall study was the publication, also in 1970, of a catalogue of possible new weapons and equipment which could be made available for field use by 1990 if the necessary R&D effort is initiated in the 1970 decade. This publication entitled "Compendium of Plausible Materiel Options" represented the results of a careful and methodical series of technological surveys and projections carried out by AMCA. Although the great majority of this work was carried out within AMCA, much source information and data were drawn from the commodity commands and laboratories of the United States Army Materiel Command. Additional materiel was provided by a small technical staff in ILC, industry, and other sources.

The materiel aspects of LCS–I were a critically important feature in that the materiel concepts emerging from the study are intended to provide a set of "new starts" in the R&D program and the materiel acquisition progress. Although many of these new systems are already in R&D, the identification of priorities specifically related to projected operational needs provides a new impetus for funding and scheduling. Moreover, an adequate lead time can thus be provided to ensure their availability in the timeframe of LCS–I.

The interaction between ILC (CONFG from August 1971) and AMCA developed into a very close collaboration during LCS–I. Contact between the two elements, which were located on adjoining floors of the Hoffman Building, became essentially a daily practice. During the evaluation of the alternative designs and the development of the final conceptual design, members of the AMCA staff worked side-by-side with the ILC staff. This close association, and the interchange of ideas that resulted, contributed significantly to the quality of the final product.

Any attempt to project from the present, particularly as far out as twenty years into the future, is a different and demanding task. As difficult as any part of LCS–I in this respect was the requirement to develop several alternative concepts for land warfare in the 1990 decade. This process is essentially creative in nature and is not amenable to a fixed and prescribed methodology. In LCS–I, separate teams of Army officers set about producing three such designs following only broad guidelines intended to ensure that different designs emerged. These guidelines provided direction so as to cover a moderate spectrum of possibilities from predictably evolutionary trends to a fairly radical employment of projected capabilities.

The basic sequence in the conceptual design process carried out by ILC involved first the development of conceptual approaches or operational themes on which to build distinct concepts of operations. The approaches were checked out in a subjective manner with map visualizations and ultimately by an in-house "murder board." The completed alternative conceptual designs were published in 1970 and circulated throughout the USACDC and within the ACO for comment. These preliminary designs were well received by the reviewers who took a lively interest in their content. Throughout the conceptual design process, the ACO interactions continued with the development of additional materiel options and development of adversary forces to be used in the war game analysis of the alternative designs.

Originally, one of the three designs was to be selected by an evaluation process to be the final recommended design. In the course of LCS–I, this method was modified to a comparative analysis of the alternative designs for the purpose of producing a final design based on strengths found in the initial three designs. The evaluation of new concepts of operations and materiel systems presented special problems due to the lack of precise organizational and effectiveness data. Normal gaming and other evaluation techniques are not entirely suitable for this purpose. Modified gaming and simulation models were adapted for the purpose, however, and the evaluation process was completed.

"Design the Land Combat System for the Army in the field for approximately 20 years in the future."

The final product of LCS–I, comprising the recommended design for a 1990s land combat system and a full report on all study elements not previously published, was completed in September of 1972. In the first two years or so of LCS–I, the Advanced Concepts Organizations in general and this study in particular were not widely known. In the later stages, however, this activity became better understood as a result of reviews by the Army Scientific Advisory Panel, various senior DA scientists and, of course, the TRIO.

In wrapping up a substantial and complex study such as LCS–I, it is appropriate to look back at the original purpose once again to judge how closely the final result satisfies that purpose. Those who conducted the study are confident that it will accomplish its goals in providing guidance for future R&D and doctrinal studies. The reception of the product by the TRIO and other reviewers support this view. Perhaps most indicative of all, the results were briefed to the members of the original Committee of Four and were well received and considered to have fulfilled the objectives set for it in their recommendations.

COMMUNICATIONS AND SYSTEMS CONTROL: IMPROVEMENT THROUGH AUTOMATION

By LTC John T. Patterson

Military communications networks, like other modern communications systems, are becoming more and more efficient and reliable. Increased efficiency and reliability are being achieved despite the fact that these networks are now more complex. Improvements achieved to date are undoubtedly the result of effective planning as well as advanced engineering techniques.

For a moment think of, and become involved in, the intricate planning that is essential to the engineering, installation, and control of an efficient and reliable communications system on today's battlefield.

First, there is the requirement. One estimate addresses a deployment of 1424 units in a two-corps, eight division Field Army. In this deployment over 270 different types of units are represented—each with varying needs to communicate. The scope of communications requirements may be indicated by that estimated for telephone services alone. There is the estimated need for over 40,000 telephone calls a day among the 1424 deployed units. This requirement can be quite a challenge to the communicator on the fluid battlefield where communications systems must be continually rearranged to keep up with units as they displace during combat operations. New requirements are here already (more about data systems later).

Second—how the requirement is satisfied. The Army's tactical communications systems have evolved over the years from a relatively unsophisticated capability to one approaching that of the "local telephone company." From balloons to carrier pigeons; to wire and cable; to walkie talkies and a family of single channel net radios; to the modern mediums—microwave, tropospheric scatter radio, and satellite systems, the modern mediums are capable of transmitting a variety of 71 channel groupings (98 maximum are planned for the COMMZ) derived over improved (pulse code modulated—time division) multiplex equipments.

The advent of Army tactical data systems presents a new and exciting challenge to the tactical communicator, one which must be met forthrightly as the new data systems are melded into the new concepts of command and control. The satisfaction of this requirement as well as the more classic user communication requirements (telephone, teletypewriter, facsimile) dictates the need for additional facilities. Developmental

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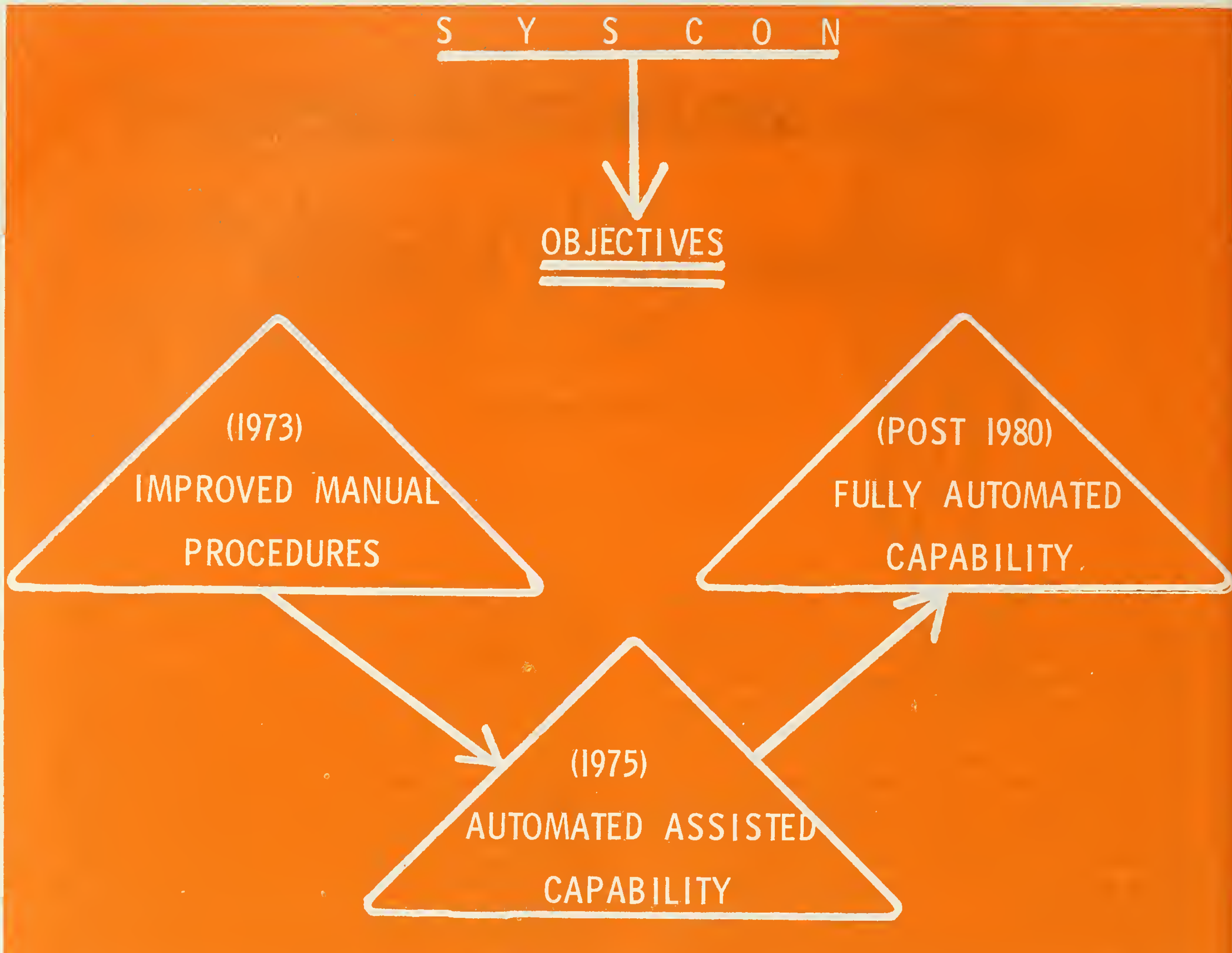


FIGURE A

actions are already underway to provide transmission facilities to accommodate both high speed (up to 38.4 Kbs) and low speed data subscribers thereby ensuring responsiveness, and maximum utilization of premium long haul tactical communications systems. The need then for advancements in communications planning, engineering, and systems control (SYSCON) is apparent. The tactical communicator is looking at those new techniques and procedures that will permit him to provide essential communication services where they are needed and when they are needed in the shortest possible time and at the minimum possible cost.

The tactical communicator has long recognized the need for improvements in this area. Innovations, local and Army wide, have been exploited to make those improvements which could be made within available resources. However, grease pencils and acetate remain the basic tools.

Bringing to bear new interests and a new impetus to this problem area, the Army has already embarked on a course which will ensure that the needed improvements in SYSCON techniques and procedures are developed and fielded in the near future.

The USA Combat Developments Command (USACDC), under the sponsorship of the Office of the Assistant Chief of Staff, Communications-Electronics (OACSC–E), is proponent for the on–going study titled "Communications Planning, Engineering and Systems Control"; short titled: SYSCON. The USACDC Communication-Electronics Agency, a subordinate element of USACDC Intelligence and Control Systems Group (USACDCINCSG) is the study agency.

The importance of developing improved SYSCON techniques and procedures cannot be overemphasized as developing command and control concepts rely more heavily on the tactical communications systems. Realizing the challenge of today and those envisioned for the Army of the future, an exhaustive ten-month, in-house survey of current manual SYSCON procedures was conducted to avoid "reinventing the wheel." The survey included a detailed review of related studies and data from operating units in the field. Most important, the survey obtained a clear view of what the Army's SYSCON needs are. The working group which completed the evaluation and analysis consisted of representatives of DA, the combat developer, materiel developer, and computer systems experts. The team's efforts notably serve as the Army's corner stone for structuring a SYSCON capability responsive to current and future needs.

In October 1971, the Computer Science Corporation, under contract to USACDC, began active development of the Army's standardized SYSCON capability. As stated in the DA study directive, this effort will achieve the objectives shown in Figure A. The study will be conducted over a eighteen month period and will terminate in April 1973.

The study effort is guided by a Study Advisory Group (SAG) chaired by the OACSC–E. Participants in the SAG include other interested DA staff elements, and representatives of the major subordinate commands of DA (AMC, CONARC, STRATCOM, CSC, and CDC). A Working Study Advisory Group (WSAG) is also established to provide direct (day-to-day, if necessary) assistance and guidance to the study effort. Chaired by USACDCINCSG, the WSAG (through the contracting officer and his representatives) provides the technical direction and Army inputs to the study efforts. The WSAG reports to and receives guidance from the SAG.

Key intermediary decision points have already been identified by the Army to ensure that the final products are responsive to the statement of work (SOW) which guides the contractual support effort. The study has already produced and rank-ordered three alternative concepts (these will be discussed briefly later in the article). The rank-ordering based upon a detailed, functional, and quantitative analysis provided personnel, cost, and effectiveness data necessary for selection of a preferred concept. A selected group of Army personnel conducted an exhaustive analysis of the rank-ordered concepts and selected the preferred concept during the period of 10–18 October 1972.

CONCEPTS

First, the great variety of functions necessary to the management of the tactical communication system have been identified as shown in Figure B. These functions describe "what has to be accomplished." Secondly, the key facilities considered essential to the effective performance of SYSCON functions have been identified as shown in Figure C. The specific function performed by these facilities have also been identified as well as their interrelationships, performance characteristics, and possible future configurations. Thirdly, necessary reports are being formatted to ensure availability of necessary data and standardization of inputs.

To ensure consideration of alternative approaches to the performance of SYSCON functions, the contractor was required to—and has—developed three alternative concepts as stated above.

Generally speaking, the concepts may be described—with reference to levels of authority—as (1) highly centralized; (2) highly decentralized; and (3) a composite of the first two. All three approaches or concepts propose the use of automated data processors and associated input/output (I/O) devices at varying levels of the communications command structure. Of course, the planned employment of automatic switches and improved technical control equipment did influence the positioning of these devices, and in many ways will complement the execution of overall SYSCON functions.

The highly centralized concept considered a concentration of responsibility and authority for

FUNCTIONS

PLANNING--14

Preparation of signal orders
Maintenance of records
Assessment and allocation of resources
Validation of user requirements
Provision of preferential services
Issue technical directives
Introduction of new equipment
Assignment of frequencies
Assignment of call signs
Contingency planning
Recording user locations
System security
Messenger service
Directory service

ENGINEERING--8

Network layout
Traffic engineering
Traffic diagrams
Line route maps
Circuit diagrams
Radio relay and radio diagrams
System performance analysis
ECCM

CONTROL--8

Restrictive measures
Dissemination of information
Authentication procedures
Restoration of services
Patching
Monitoring
Reporting
Testing

FIGURE B

direction and control of signal resources at relatively high echelons in the Signal command hierarchy. Specifically, in this concept, overall direction and control are exercised only by the most senior commands and system control centers of their respective major Signal units. Assignment of responsibility and authority for each function was made on the basis of insuring conservation of resources as well as the provision for centrally directed control of Signal operation. The most significant aspect of this concept is the proposed combining (for control purposes) of the area communications system of the Theater Army and Field Army into a single system. The degree of centralization may be further illustrated when considering how a specific function would be performed under this particular concept. As an example, in this concept, traffic engineering and a network layout for the combined area system would be accomplished by the Theater Army Communication Command. As you may have deduced already, this concept would optimize management of resources, but would have the disadvantages of limited flexibility and a high degree of vulnerability.

At the opposite extreme the highly decentralized concept would result in the far reaching delegation of authority and responsibilities within the communication structure and from the major command staff elements to the operating

SYSCON FACILITIES

TECHNICAL CONTROL CENTER (TECHCONCEN)--The TECHCONCEN is the focal point within the communications node where direct responsibility lies for ensuring that the communication multi-channel links are monitored and maintained in a condition consistent with operational requirements and standards.

FACILITIES CONTROL CENTER (FACCONCEN)--The FACCONCEN is the nodal management facility where an appropriate commander directs and co-ordinates the subordinate activities within the node.

SYSTEMS CONTROL CENTER (SYSCONCEN)--The SYSCONCEN is the facility established to accomplish detail system planning, engineering, and control. This facility, in comjunction with the TECHCONCEN and FACCONCEN, coordinates, directs, and controls the implementation and operation of the integrated tactical communications system.

FIGURE C

units. To this end an objective of the concept was to determine if the performance of a particular function currently accomplished at the various C–E staff levels could be performed at the Signal operating unit level. Important advantages of this concept are the ability to be responsive to local users and the flexibility of readily adjusting to changes in force structure. The concept considered a "radical" proposal which would assign an area SYSCON functional responsibility to the Corps—making it responsible for planning, engineering and controlling the area system within the Corps sector. The concept further envisaged that the lowest Signal unit command level that could provide required resources would also have the authority to validate its own requirements. This overall concept provides great flexibility and reduces vulnerability significantly below that which would be afforded by the highly centralized concept. However, a greater amount of resources would be required.

The preferred concept, or composite approach, takes the middle ground, and more closely resembles current philosophy. It concentrates on improving the performance of SYSCON functions without the need for major doctrinal changes. Automated data processors are proposed at the location at which they can best serve the system control functions. The conceptual theme is to decentralize near-term central functions and to centralize planning and engineering functions so that maximum advantage can be realized from automation. Direct (sole user) as well as common user communications services are provided to the various SYSCON facilities (See Figure B) in accordance with the overall conceptual approach.

Throughout the conduct of the study, consideration has been given to the planning for implementation of the preferred concept, when approved, to ensure compliance with the study objectives. Accordingly, consideration is given not only to the early implementation of improved manual procedures, but also alternative methods for achieving that degree of automation obtainable in light of cost as well as effectiveness factors.

The advent of an improved SYSCON capability for the Army in the Field will open new avenues for the provision of minimum essential communications support in a timely and responsive manner commensurate with the requirements of the modern battlefield. The USADC Intelligence and Control Systems Group, and its subordinate element, the Communications-Electronics Agency are dedicated to ensuring the achievement of this objective in support of the Army in the field.

TECOM TESTING PLANS TO BE MADE AT ABERDEEN PROVING GROUND

The U.S. Army Test and Evaluation Command (TECOM) will host a three-day Environmental Test Planning Conference here starting in late February.

The purpose of the conference is to plan the environmental test program which will be conducted at the command's arctic, tropic and desert test centers throughout the fiscal year beginning July 1. All testing to be performed or supported by the test centers in Fiscal Year 1974 will be determined at this meeting.

More than 100 conferees are expected to attend. Representation will inlude the Army Materiel Command and its subordinate agencies, project managers, and laboratories as well as representatives of other services, commands, and agencies. This year's conference will be held under the guidelines of the Department of the Army's new systems acquisition program which is having far reaching effects on many elements of the Army, including the test and evaluation process. The new program establishes the Army's basic policies which seek to minimize costs, shorten development time, and assure adequate performance.

The Forward Area Alert Radar (FAAR) is scheduled for testing at Arctic Test Center during the coming Fiscal Year.

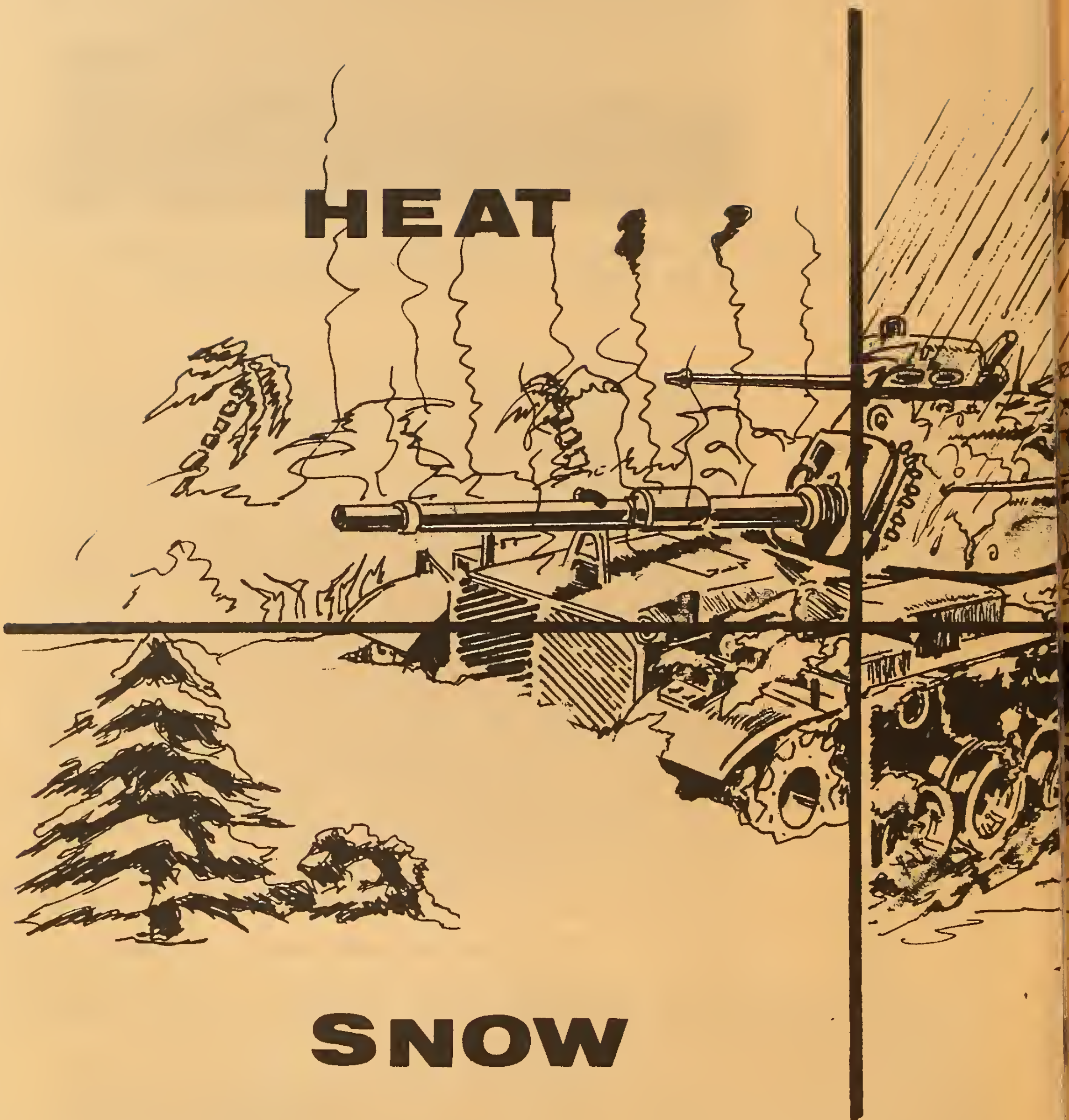
The Improved HAWK Missile System will undergo tests at the Tropic and Arctic Test Centers this year.

The M551 SHERIDAN, pictured here at the Arctic Test Center, is scheduled to undergo testing in Fiscal Year 74 at the desert test center operated by Yuma Proving Grounds Ariz.

TECOM testing under extreme natural conditions is conducted by the Arctic Test Center at Ft. Greely, Alaska, by the Tropic Test Center at Ft. Clayton, C.Z. (Panama) and at the desert test center operated by Yuma Proving Ground, Arizona. The three test centers are organized and equipped to perform environmental phases of development testing (engineer and service-user) as well as other development, production and post-production testing.

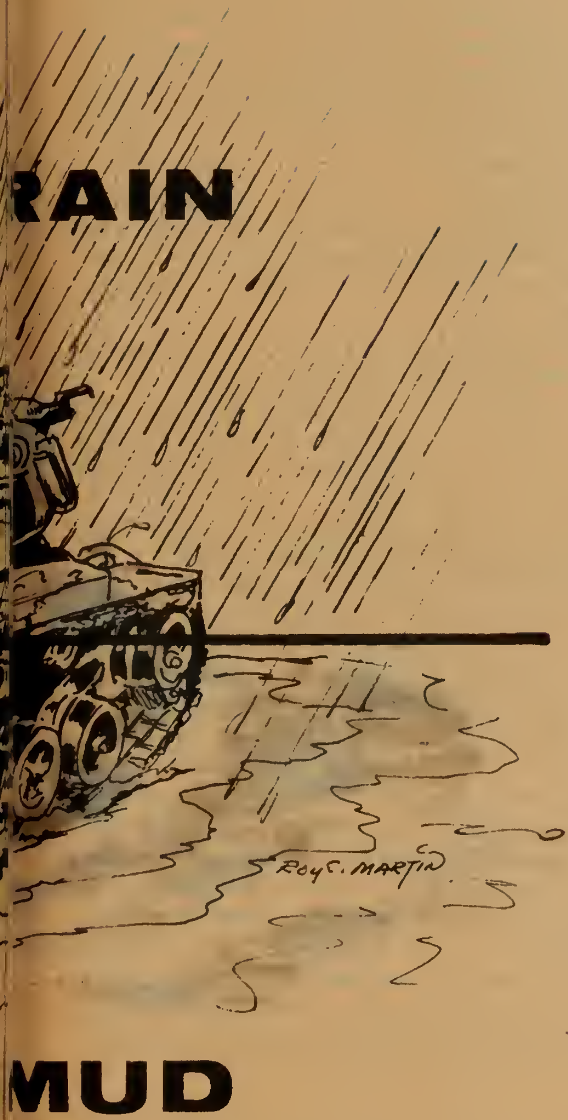
During the conference, three environment-oriented committees, chaired by the test center commanders, will consider materiel items submitted for testing.

This year's conference will be under the direction of Colonel William H. Young, director of the TECOM Test Operations Directorate. Kendall L. Peterson is the project officer for the conference.



There are many factors that affect the results of experiments—weather is just one.

THE DESIGN OF EXPERIMENTS



By Mr. Carl B. Bates

The objective of an experimental design is to provide the maximum amount of information at a minimum cost. That is, experimental design is concerned with both *statistical efficiency* and *resource economy*. Both features should be present in any scientific investigation. Experience has shown that the return for the effort spent in designing an experiment far outweighs the expense.

The three basic principles of experimental design are *replication, randomization,* and *local control*. Replication serves a dual purpose. It makes a statistical test of significance possible (by providing a valid estimate of experimental error), and it improves the precision of the estimated effects of the factors under investigation. While replication makes a test of significance possible, randomization makes the test valid by eliminating bias and by making it appropriate to analyze the data as though the errors were independent. Errors from experimental units adjacent in time or space tend to be correlated, but the randomization gives any two "treatments" being compared an equal chance of being adjacent.

For example, if two tank types (A and B) are to be compared with four test runs each, the order of the eight runs should be completely randomized. From the operational viewpoint, a design like AAAABBBB or BBBBAAAA might be more convenient. However, either of these designs is poor because tank effect and time effect is "confounded." The weather, visibility, ground condition, crew fatigue, etc., may be quite different during the first four runs than they are during the last four runs. Consequently, that difference attributed to tank effect *may be* grossly inflated due to the presence of other indistinguishable effects because of improper ran-

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domization. Proper randomization would guard against continually favoring or handicapping either tank type.

Replication and randomization make a valid test of significance possible. Local control then makes the test more sensitive (or powerful) by reducing experimental error. That is, local control makes the experimental design more efficient through the use of such features as balancing, blocking, and grouping of the experimental units.

The following partial list contains areas of concern during the design phase:

1. Choice of response or dependent variable.
2. Identification of existing independent variables (factors) involved.
3. Identification of controllable and uncontrollable factors.
4. Selection of controllable factors to be varied.
5. Identification of levels of these controllable factors.
6. Identification of qualitative and quantitative factors.
7. Identify factors having fixed levels and those having random levels.
8. Relationship of factors (crossed or nested).
9. Restriction upon randomization.
10. Method of randomization.
11. Order of experimentation.
12. Formulation of hypotheses.

Ultimately in the design phase, a mathematical model is hypothesized for the relationship of the dependent variable to the independent variables. That is, the response variable is expressed as a function of the independent variables. This hypothesized model, along with all the necessary assumptions concerning the model, provides the basis for a statistical analysis which is performed on the experimental data. An outline of a proposed statistical analysis at this point provides an excellent opportunity for assuring that the analysis does, in fact, accomplish the objectives of the experiment. The basis for the interpretation of the statistical analysis performed on the experimental data is the mathematical theory of probability, i.e., the mathematical theory of probability provides the foundation of statistical inferences. These inferences must, therefore, be in the form of probabilistic statements expressing the degree of confidence which the analyst has in the inferences because of the random variation due to uncontrolled or uncontrollable factors. Consequently, to ensure the proper application of inductive statistical methodology in order to evaluate experimental data by means of the mathematics of probability, experiments must be designed in accordance with the principles of the science of statistics.

Many advantages, both direct and indirect, can result if full use is made of the principles of experimental design. A partial list of the advantages of statistically designed experiments is as follows:

1. The statement of experimental objectives is usually developed more completely.
2. The required coordination between the analyst(s) and the experimenter(s) facilitates the analysis, the interpretation of results, and the drawing of conclusions.
3. Attention is focused on inter-relationships among the variables under investigation.
4. Sources of variability are identified and measured with increased accuracy and precision.
5. The number of experimental units required to achieve a stated objective can generally be accurately estimated and often reduced.
6. An estimate of experimental error is usually obtained.
7. A greater quantity of usable data is obtained for each dollar expended.
8. Analysis can be improved by eliminating incorrect analysis resulting from a lack of understanding how the experiments were executed.
9. Cooperation can be improved between groups not in complete contact with one another during the execution and the analysis phases.
10. The invalid extrapolation of data beyond the range of experimental conditions can be avoided.

Although a proper and sound design phase is a necessary prerequisite to valid statistical inferences from the analysis of experimental data, sound design alone is not sufficient. The connecting link between the design and analysis phases is the execution phase. The analyst who naively assumes rather than assures that the conduct of an experiment precisely follows the design for the experiment jeopardizes the validity of the statistical analysis. Deviation from the experimental design during the execution phase may

nullify assumptions underlying the analysis methodology to the extent that the final statistical inferences are invalidated. Obviously, emergencies and complications may be encountered during the execution of an experiment and cause it to deviate from the design. In such cases, the implication of the deviation(s) should be determined before continuing the execution phase, if possible and practical. *Any* and *all* deviations from the experimental design must be completely recorded and thoroughly documented in order that appropriate adjustments, if necessary, may be made in the planned analysis.

Only after an experiment is properly designed and consistently executed can the analysis of, and conclusions from, experimental data have validity. Consequently, sound design is essential if experimentation is to continue to serve its vital role in the fulfillment of the missions of the Department of the Army.

THE PHASES OF EXPERIMENTATION

The Army Mathematics Steering Committee sponsors an annual Conference on the Design of Experiments in Army Research, Development, and Testing. The committee initiated the conferences with "the intent that these Design Conferences afford an opportunity to statistical design specialists and Army research, development, and testing personnel to get together and exchange views and experiences in this rapidly growing field. It is also the intent that through invited addresses and special panel discussions many of the new developments in the theory of Statistical Design and Analysis of Experiments be brought to the attention of Army scientists; they can then make use of these new theories to help solve some of their complicated design problems." Proceedings of the annual Conferences are published by the US Army Research Office, Durham. This year the US Army Test and Evaluation Command, Aberdeen Proving Ground, Maryland hosted the Eighteenth Conference on the Design of Experiments in Army Research, Development, and Testing on 25, 26, and 27 October.

The three general phases of experimentation are—the design phase, the execution phase, and the analysis phase. The design phase involves the complete set of actions *taken prior to* the execution of the experiment; the execution phase refers to the actual conduct of the experiment; and the analysis phase includes data reduction, numerical computations, and interpretation of results. The importance of the design phase cannot be overemphasized because of the dependence of the analysis phase upon the design phase of experimentation. That is, the basis of the interpretation of experimental data is the analysis, but the analysis is dictated by the experimental design.

"Designing" an experiment simply means "planning" an experiment so that information will be collected which is relevant to the problem under investigation. Naturally, this planning phase is the time to assure that the appropriate quantity and quality of data will be obtained in a manner which permits the proper application of inductive statistical methodology and, consequently, an *objective* analysis leading to valid inferences with respect to the stated problem. An obvious prerequisite to designing an experiment is a precise statement of the problem, i.e., a definitive objective.

CIVIL-MILITARY OPERATIONS EXAMINED BY SPECIAL OPERATIONS AGENCY

By Mr. Herschel G. Nance

A Combat Developments Command Civil-Military Operations Study designed to formulate doctrine for the new G5, S5 staff concept is being conducted by the USACDC Special Operations Agency at Fort Bragg. This study is an outgrowth of an Army Chief of Staff decision to merge civil affairs and psychological operations staff functions under a single coordinating staff officer, the G5. The decision authorized S5, civil-military operations officers, at brigade, regiment, group, and selected battalions. However, until now, definitive doctrine to implement the concept has not been developed.

Despite the experiences of the war in Vietnam, the study has found existing Army doctrine on civil-military operations still oriented toward World War II and the European environment, stressing conditions of high- and mid-intensity conflict. In addition, the preponderance of existing doctrine places undue emphasis on military government. It frequently fails to provide adequate guidance in such critical areas as advisory assistance in stability operations environments, and civil affairs and psychological operations support of the battlefield commander.

Conducted by a team led by LTC Robert B. Helmlinger, the analysis suggests that the Army of the future will be as much concerned with employing civil affairs resources to prevent escalation of potential insurgency situations as it will be with assisting indigenous populations to recover from the effects of general war.

Mr. Nance is the Doctrine Consultant at the CDC Special Operations Agency at Ft. Bragg, N.C.

The Civil-Military Operations Study (CIMO) addresses the 1976–1986 time frame to determine requirements for civil-military doctrine during all intensities of conflict. Each intensity is examined in terms of civil affairs and psychological operations functional needs generated in the preconflict, conflict, and post-conflict phases with a view toward recommending doctrine responsive to the needs. If the doctrine is effectively structured, its application in the future may be of assistance in helping to prevent conflict. The functions examined are portrayed in the wheels of the bicycle. (See boxed insert.)

The study team has left no stone unturned in its efforts to uncover all facets of civil-military operations, both past and future, that have any type of cause-effect relationship and implications for civil-military doctrine. The team has surveyed the records of World War II, the Korean War, and other twentieth century conflicts; solicited information from hundreds of personnel known to have in-depth experience or expertise in the subject area; obtained large scale contributions from civil affairs and psychological operations units of the Army Reserves; and interviewed numerous personnel from allied nations, the other services, and civil research institutions. Perhaps the most productive information has come from an in-depth analysis of current intelligence to determine the nature of the environment in which the Army will be operating in the future and the types of problems with which it will have to contend. This analysis has resulted in the identification of social, economic, psychological, and political conditions that will

characterize each of the major regions of the world during the study time frame. A companion analysis examines the capabilities of selected nations in civil affairs and PSYOPS functional areas. Taken together, the two analyses highlight the extent of the effort that may need to be applied by the United States in light of the current doctrine to counter the Communist threat in the area being considered. The current doctrine stipulates that the United States will participate in the defense and development of allies and friends, but will not conceive all the plans, design all the programs, execute all the decisions, or undertake all the defense of the free nations of the world.

Doctrine evolving from the study must provide for maximum flexibility of application. It must be adaptable across the entire spectrum ranging from non-conflict situations of peacetime to general mobilization for total war. It must also account for limited manpower and dollar constraints at the peacetime end of the spectrum and the unconstrained resources for general war at the other end. Structuring the analysis to parallel requirements for each level of increasing intensity, the study team has developed factors to guide their research to each portion of the continuum. For example, a cold war, limited resource situation requires doctrine for low-intensity conflict; for psychological operations support of civil affairs; for situations of no civil governmental authority; for worldwide applicability; for developing nations on the one hand and those with highly sophisticated environments on the other; and for assistance oriented toward mid/high-intensity warfare. During general mobilization, the doctrine would deal with mid/high-intensity situations wherein voids exist in psychological operations support; where there are varying degrees of civil governmental authority; where the threat is primarily European; and where the environment is highly sophisticated.

Many developing countries have highly centralized governments with critical shortages of managerial, technical, and administrative skills. In most cases, these countries possess no capability in civil defense and have inadequate resources for public safety. Communication and transportation facilities are inadequate for requirements to combat insurgency and the overall economy is frequently too poor to stimulate broad popular support for the government. These characteristics will impact upon U.S. advisory assistance efforts by creating needs for advisors with specific functional skills and for logistical and technical augmentation of host country assets. It also creates a requirement for free world effort to be geared toward prevention of conflict rather than attempted suppression once a conflict is underway. In the European environment and that of other highly developed countries, civil affairs obligations in rear support areas, including the COMMZ, will be primarily of the "Area Support" variety and oriented toward providing essential augmentation and logistical support to host government operation. The unique sophistication of European governmental operations may negate substantive requirements for pre-conflict augmentation or assistance. However, during actual conflict, the requirement for care and control of refugees, evacuees, and displaced persons will become critically important.

In addition to examining the many aspects of historical data and current intelligence in the area of civil-military relations, the study team has conducted a detailed staff functional analysis of civil affairs and psychological operations. The team has examined not only the currently designated responsibilities of the G5 staff but has looked into the missions and responsibilities of all other members of the coordinating staff group to determine areas that interface with G5 responsibilities. Where applicable, the team has nominated candidate functions for addition or deletion. As a result of the functional analysis, future field manuals and other doctrinal documents will contain uniform and definitive guidance universally applicable to S5 and G5 staff sections of the Army in the Field.

Another important aspect of the study is its chapter on definitions. Since World War II, multiple definitions of civil affairs and psychological operations terms have entered the Army system. The CIMO study team has found that many of these definitions have become duplicatory, redundant, or misleading. Final output of the study will recommend deletion of a number of terms, changing of others and bringing the terms that remain more into line with civil-military needs of the 1976–1986 time frame.

Upon approval of the final draft of this study, appropriate field manuals will be revised to incorporate study recommendations.

The Point of the Arrow

FEBRUARY QUESTIONS

I. In the current reorganization of the Army, where will the combat developments functions be located? (What major headquarters and what part of that headquarters?)
2. Combat Systems Group and Intelligence and Control Systems Group will go to what activity under the reorganization?
3. Concepts and Force Design Group will go to what activity, and Personnel and Logistics Group will go to what center?
4. Combat Developments Experimentation Command and Systems Analysis Group will come under the control of what command?
5. The Strategic Studies Institute will now be under what organization?

JANUARY ANSWERS

1. The Soviet Rifle Squad consists of 8 men.
2. The largest weapon in the Soviet Rifle Squad is the 80mm anti-tank rocket.
3. The T-62 is the Soviet Medium Tank. It mounts a 12.7mm machine gun and a coaxial 7.62mm machine gun.
4. The basic infantry shoulder-fired weapon in the Soviet Army is the AKM Assault Rifle.
5. The Soviet Army's medium tank has a smooth bore gun that is 115mm in size.

For God and Country

What becomes of a nation if it loses faith? Read the history of the French Revolution.

Here are some of the facts. In 1793 the religion of "reason" was proclaimed in Paris, France. The revolutionaries wanted first to honor "reason" in a theater, but then an infernal thought came to them and they went to Notre Dame Cathedral. A dancer from the opera was seated on a throne in the sanctuary; and girls adorned with wreaths of oak leaves sang anthems in honor of the new religion. The treasures of the church were piled upon a donkey, a bishop's miter was placed upon its head, the sacred vessels were placed before it, and the people danced around it. From the sacred chalices they drank brandy, and served herrings from other consecrated vessels. Similar incidents took place in other churches.

And what was the end of all this? The guillotine blade rose and fell from morning to night. The executioners became weary of murdering. In the last months of 1793 in the neighborhood of Nantes alone, the number of beheaded, shot, and drowned was at least fifteen thousand. This is what happens to a nation that scoffs at Faith.

Take away God, then there will be no one whose commands bind unbridled human instincts, and the nation will become one big gang of thieves and assassins.

Take away God, then there will be no difference between good and evil; then every passion will be unrestrained.

Take away God, then every honest man, every charitable, compassionate, mericiful man is a fool, a lunatic at large.

If history proves nothing else, it proves that the support and foundation of every state is the moral law. George Washington said: "Political prosperity rests on two main supports: religion and morality." It is vain for a people to be victorious in war, in commerce, and in industry if it is not also victorious in moral life.

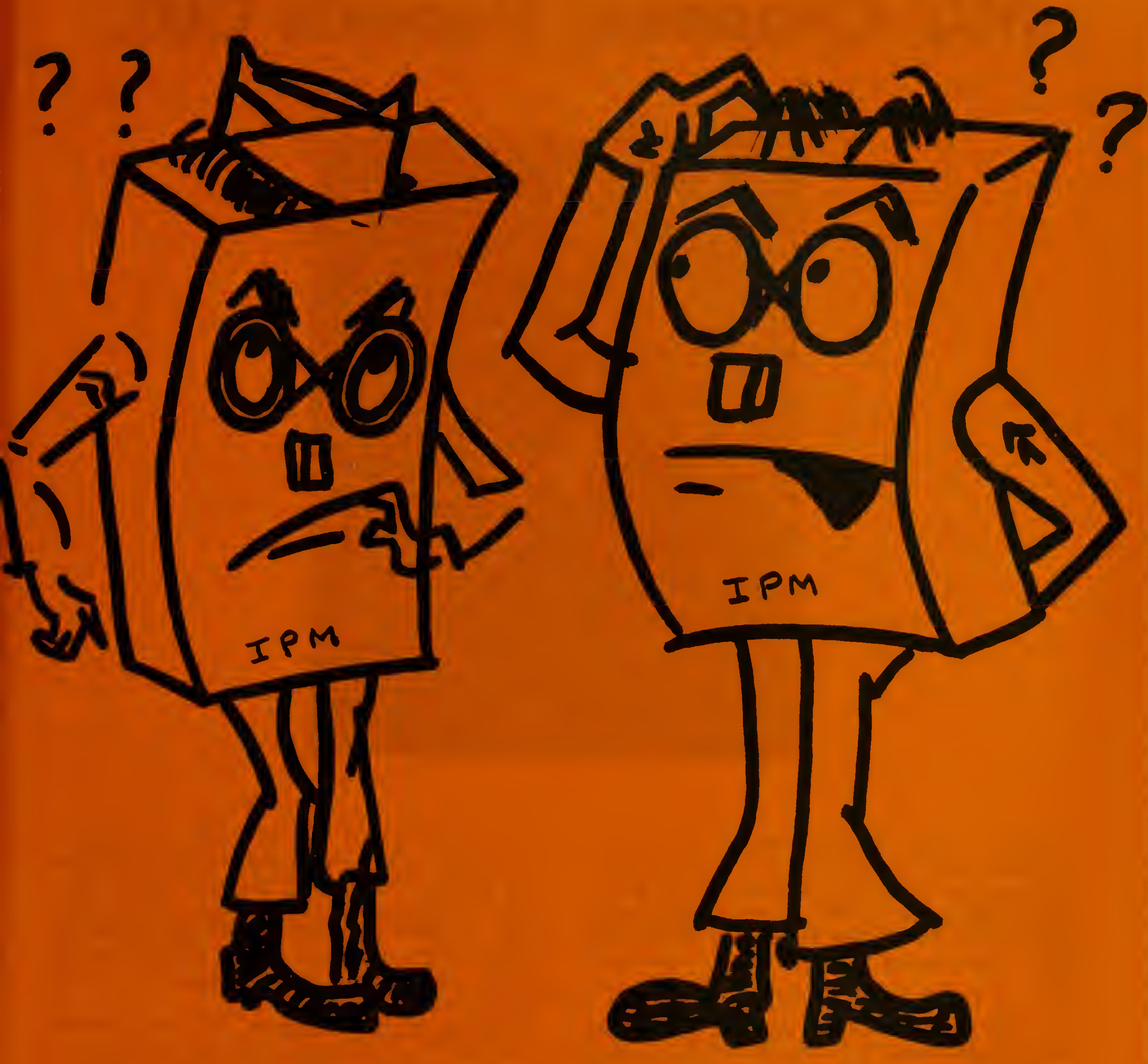
On October 6, 1849, the thirteen martyrs of Arad met their death. One of them, General Schweidel, former governor of the citadel of Buda, after the death sentence and shortly before his execution, turned to the regimental chaplain and said: "Chaplain, here is the cross I inherited from my father. Always, even in time of battle, I carried it with me. Please give it to my son." But, as if something had flashed into his mind, he took it back again saying: "I wish to hold it in my hands as I die. After I am dead, do not hesitate to take it out of my hands and give it to my son."

The rifles spoke, and the general was dead. But such a nation cannot be lost where the fathers teach love of God and faith in Him to their sons.

May our beloved nation be mindful of its great spiritual heritage, especially in these critical days of national crisis.

Let us never forget that he who has lost his fortune, has lost much; he who has lost his arm, has lost still more. He who has lost his faith, has lost all.

Chaplain (Col.) Joseph S. Chmielewski
Former CDC Staff Chaplain



"Are we going to be CDC - Minus or TRADOC - Plus?"

MG Chapman Departs CDC

Major General Chapman leaves CDC on 23 February 1973 for assignment to the Office of the Secretary of Defense as Senior Army Member, WSEG. (Weapons Systems Evaluation Group.) General Chapman has served as Deputy Commanding General since September 1971.

During his tour, General Chapman served for two periods as both DCG and CofS, a two hatted role which those familiar with the headquarters operation will surely recognize as awesome. He headed up the SATE study, which resulted in nearly 50 separate policy, personnel and procedural changes to improve the CD process. As CDC member of DA Steering Committee on the Wheeled Vehicle study, the Main Battle Tank TF and the Attack Helicopter TF, he participated in decisions which heavily impact on future Army capability.

He administered the CDC Study Program, served on the Army Logistics Policy Council and the Military Priority Procurement Board. General Chapman's last major assignment as DCG was in CDC's planning for the Reorganization of the Army. This task was so vital to the CD process that General Norton asked him to work full time at it.

General Chapman leaves CDC with mixed feelings. "Looking back over my tour here, I have one regret—that is, not getting out into the 'field' as much as I should have, to the subordinate commands where so many dedicated people labor diligently, often without recognition, to turn out CDC's end products. To all members of the Command go my prayers and best wishes for future success. Those who remain in the CD business following reorganization must keep our "Vision to Victory" alive, for our Army and for our Country."

Commanding General	**LTG John Norton**
Director, Command Presentations	**COL George H. Hallanan, Jr.**
Information Officer	**LTC Gerald D. Hill, Jr.**
Editor	**LT Robert H. Gregory**
Production Editor	**LT Gary R. Steimer**